

In the Claims

For the convenience of the Examiner, all pending claims are set forth below, whether or not an amendment is made. Please amend the claims as follows:

1. (Currently Amended) An apparatus for verifying a validity of a path, comprising:

a network element included in a first autonomous system ~~and receiving that:~~
constructs a directed graph comprising a plurality of nodes and a plurality of edges, a node representing an autonomous system, an edge representing a connection between two autonomous systems, the edges marked tentative;

receives an advertisement communication from a second autonomous system ~~that includes a list of one or more connected autonomous systems, wherein the network element identifies system;~~

determines whether the first autonomous system claims a connection to the second autonomous system ~~and system;~~

determines from the advertisement communication whether the second autonomous system claims a connection to the first autonomous system ~~such that system;~~

if the first autonomous system claims a connection to the second autonomous system and the second autonomous system claims a connection to the first autonomous system, establishes that there is two-way connectivity is established between the first and second autonomous systems, the network element responding to the establishment of the two-way connectivity by constructing a directed graph that includes two nodes representing the first and second autonomous systems respectively, and wherein an edge is formed that connects the two nodes, whereby additional two-way connectivity checks are performed through advertisements in a border gateway protocol (BGP) such that unverified states are removed systems;

if there is two-way connectivity between the first and second autonomous systems, marks the edge representing the connection between the first and second autonomous systems as verified; and

if there is no two-way connectivity between the first and second autonomous systems, removes the edge representing the connection between the first and second autonomous systems from the directed graph, and wherein when a third autonomous system

~~sends routing information associated with a third path to the first autonomous system, the third path is verified by examining validated connections in the directed graph.~~

2. (Previously Presented) The apparatus of Claim 1, wherein the network element receives an update message from the second autonomous system, the update message including an autonomous system path, and wherein the network element verifies the autonomous system path by referencing the directed graph.

3. (Original) The apparatus of Claim 1, wherein the network element is a selected one of a group of elements consisting of:

- (a) a router;
- (b) a switch;
- (c) a bridge;
- (d) a gateway;
- (e) a loadbalancer; and
- (f) a processor.

4. (Original) The apparatus of Claim 1, wherein the network element includes a table operable to store the directed graph and to be referenced in order to verify one or more autonomous system paths that are received by the network element in one or more update messages.

5. (Original) The apparatus of Claim 1, wherein the advertisement communication is encapsulated in a border gateway protocol (BGP).

6. (Previously Presented) The apparatus of Claim 1, wherein the network communicates the directed graph to an administrator element that is operable to communicate information included within the directed graph to one or more additional network elements.

7. (Currently Amended) A method for verifying a validity of a path, comprising:
constructing a directed graph comprising a plurality of nodes and a plurality of edges,
a node representing an autonomous system, an edge representing a connection between two
autonomous systems, the edges marked tentative;

~~receiving an advertisement communication at a first autonomous system from a~~
~~second autonomous system, the advertisement communication including a list of one or more~~
~~connected autonomous systems; system;~~

~~identifying~~ determining whether the first autonomous system claims a connection to
the second autonomous ~~system and system;~~

determining from the advertisement communication whether the second autonomous
system claims a connection to the first autonomous ~~system such that system;~~

if the first autonomous system claims a connection to the second autonomous system
and the second autonomous system claims a connection to the first autonomous system,
establishing that there is two-way connectivity is established between the first and second
autonomous systems; and

if there is two-way connectivity between the first and second autonomous systems,
marking the edge representing the connection between the first and second autonomous
systems as verified; and

~~responding to the establishment of the two-way connectivity by constructing a~~
~~directed graph that includes two nodes representing the first and second autonomous systems~~
~~respectively, wherein an edge is formed that connects the two nodes, whereby additional~~
~~two-way connectivity checks are performed through advertisements in a border gateway~~
~~protocol (BGP) such that unverified states are removed~~ if there is no two-way connectivity
between the first and second autonomous systems, removing the edge representing the
connection between the first and second autonomous systems from the directed graph, and
wherein when a third autonomous system sends routing information associated with a third
path to the first autonomous system, the third path is verified by examining validated
connections in the directed graph.

8. (Previously Presented) The method of Claim 7, further comprising:
receiving an update message from the second autonomous system, the update message including an autonomous system path, wherein the network element verifies the autonomous system path by referencing the directed graph.

9. (Original) The method of Claim 7, wherein the first autonomous system includes a network element that includes a table operable to store the directed graph and to be referenced in order to verify one or more autonomous system paths that are received by the network element in one or more update messages.

10. (Original) The method of Claim 7, wherein the advertisement communication is encapsulated in a border gateway protocol (BGP).

11. (Original) The method of Claim 7, wherein a network element included in the first autonomous system is operable to communicate the directed graph to an administrator element that is operable to communicate information included within the directed graph to one or more additional network elements.

12. (Currently Amended) A system for verifying a validity of a path, comprising:
means for constructing a directed graph comprising a plurality of nodes and a plurality of edges, a node representing an autonomous system, an edge representing a connection between two autonomous systems, the edges marked tentative;

means for receiving an advertisement communication at a first autonomous system from a second autonomous system, the advertisement communication including a list of one or more connected autonomous systems; system;

means for identifying determining whether the first autonomous system claims a connection to the second autonomous system and system;

means for determining from the advertisement communication whether the second autonomous system claims a connection to the first autonomous system such that system;

means for, if the first autonomous system claims a connection to the second autonomous system and the second autonomous system claims a connection to the first autonomous system, establishing that there is two-way connectivity is established between the first and second autonomous systems; and

means for, if there is two-way connectivity between the first and second autonomous systems, marking the edge representing the connection between the first and second autonomous systems as verified; and

means for responding to the establishment of the two way connectivity by constructing a directed graph that includes two nodes representing the first and second autonomous systems respectively, wherein an edge is formed that connects the two nodes, whereby additional two-way connectivity checks are performed through advertisements in a border gateway protocol (BGP) such that unverified states are removed means for, if there is no two-way connectivity between the first and second autonomous systems, removing the edge representing the connection between the first and second autonomous systems from the directed graph, and wherein when a third autonomous system sends routing information associated with a third path to the first autonomous system, the third path is verified by examining validated connections in the directed graph.

13. (Previously Presented) The system of Claim 12, further comprising:
means for receiving an update message from the second autonomous system, the update message including an autonomous system path, wherein a network element verifies the autonomous system path by referencing the directed graph.

14. (Original) The system of Claim 12, wherein the first autonomous system includes a network element that includes a table operable to store the directed graph and to be referenced in order to verify one or more autonomous system paths that are received by the network element in one or more update messages.

15. (Original) The system of Claim 12, wherein the advertisement communication is encapsulated in a border gateway protocol (BGP).

16. (Original) The system of Claim 12, wherein a network element included in the first autonomous system is operable to communicate the directed graph to an administrator element that is operable to communicate information included within the directed graph to one or more additional network elements.

17. (Currently Amended) Software embodied in a computer readable medium, the software comprising computer code such that when executed is operable to:

construct a directed graph comprising a plurality of nodes and a plurality of edges, a node representing an autonomous system, an edge representing a connection between two autonomous systems, the edges marked tentative;

~~receive an advertisement communication at a first autonomous system from a second autonomous system, the advertisement communication including a list of one or more connected autonomous systems; system;~~

~~identify~~ determine whether the first autonomous system claims a connection to the second autonomous system ~~and system;~~

determine from the advertisement communication whether the second autonomous system claims a connection to the first autonomous ~~system such that system;~~

the first autonomous system claims a connection to the second autonomous system and the second autonomous system claims a connection to the first autonomous system, establish that there is two-way connectivity is established between the first and second autonomous systems; and

if there is two-way connectivity between the first and second autonomous systems, mark the edge representing the connection between the first and second autonomous systems as verified; and

~~respond to the establishment of the two-way connectivity by constructing a directed graph that includes two nodes representing the first and second autonomous systems respectively, wherein an edge is formed that connects the two nodes, whereby additional two-way connectivity checks are performed through advertisements in a border gateway protocol (BGP) such that unverified states are removed if there is no two-way connectivity between the first and second autonomous systems, remove the edge representing the connection between the first and second autonomous systems from the directed graph, and wherein when a third autonomous system sends routing information associated with a third path to the first autonomous system, the third path is verified by examining validated connections in the directed graph.~~

18. (Previously Presented) The medium of Claim 17, wherein the code is further operable to:

receive an update message from the second autonomous system, the update message including an autonomous system path, wherein a network element verifies the autonomous system path by referencing the directed graph.

19. (Original) The medium of Claim 17, wherein the first autonomous system includes a network element that includes a table operable to store the directed graph and to be referenced in order to verify one or more autonomous system paths that are received by the network element in one or more update messages.

20. (Original) The medium of Claim 17, wherein the advertisement communication is encapsulated in a border gateway protocol (BGP).

21. (Original) The medium of Claim 17, wherein a network element included in the first autonomous system is operable to communicate the directed graph to an administrator element that is operable to communicate information included within the directed graph to one or more additional network elements.